WHAT IS CLAIMED:

1. A method for measuring length in an interferometer, comprising:

generating radiation having a known wavelength profile;

amplifying the radiation to produce amplified radiation;

producing an interference pattern;

measuring the interference pattern; and

calculating one or more lengths within the interferometer using the measured interference pattern.

2. The method of claim 1, wherein said generating includes:

emitting coherent radiation.

3. The method of claim 1, wherein said generating includes:

emitting noncoherent radiation, and

focusing the noncoherent radiation.

4. The method of claim 3, wherein said generating further includes:

filtering the noncoherent radiation to obtain wavelengths within a spectral band.

5. The method of claim 1, wherein said amplifying includes:

increasing a magnitude of the radiation by at least 20 dB.

6. The method of claim 1, further comprising:

adjusting a wavelength scale for measurement of spectral data taken during normal operation of the interferometer.

7. The method of claim 1, wherein said calculating includes:

calculating an amount of movement by a mirror within the interferometer.

8. The method of claim 1, further comprising:

decreasing a wavelength of the amplified radiation.

9. The method of claim 1, wherein said calculating includes:

interpolating between zero crossings of the interference pattern.

10. A device, comprising:

a radiant source configured to emit radiation;

an optical amplifier configured to amply the radiation emitted by the radiant source to produce amplified radiation;

at least two optical elements configured to produce an interference pattern from the amplified radiation;

a detector configured to detect the interference pattern and to generate data therefrom; and

a processor configured to measure one or more lengths from the data.

11. The device of claim 10, wherein the radiant source includes:

a distributed feedback laser diode.

12. The device of claim 10, wherein the radiant source includes:

a gas discharge lamp.

13. The device of claim 12, wherein the radiant source further includes:

at least one lens configured to deliver the radiation from the gas discharge lamp to the optical amplifier, and

an optical filter configured to pass a narrow spectral band of the radiation.

14. The device of claim 10, wherein the optical amplifier includes:

an erbium doped fiber amplifier.

15. The device of claim 10, wherein the optical amplifier includes:

a semiconductor optical amplifier.

16. The device of claim 10, wherein the at least two optical elements include:

a movable mirror configured to vary a length of an optical path and change the interference pattern.

17. The device of claim 16, wherein the processor is configured to calculate the length of the optical path using the data.

18. The device of claim 10, further comprising:

a nonlinear optical device configured to decrease a wavelength of the amplified radiation.

19. The device of claim 10, wherein the processor includes:

a phase-locked loop circuit.

20. A method for determining a length in a spectrometer, comprising:

generating radiation including a precisely known wavelength;

amplifying the radiation to produce amplified radiation;

creating an interference pattern;

increasing a precision available for a length measurement;

detecting the interference pattern; and

performing the length measurement from the detected interference pattern.

21. The method of claim 20, further comprising:

calibrating data obtained with the spectrometer using the length measurement.

22. The method of claim 20, wherein said increasing includes:

changing a wavelength of the amplified radiation.

23. The method of claim 20, wherein said increasing includes:

interpolating between zero crossings of the interference pattern.

24. The method of claim 23, wherein said increasing further includes: changing a wavelength of the amplified radiation.